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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/728,295	12/04/2003	Mohamed Y. Soliman	2003-IP-011150U1	7913
7590 03/23/2007 Robert A. Kent Halliburton Energy Services 2600 S. 2nd Street Duncan, OK 73536-0440			EXAMINER GEBRESILASSIE, KIBROM K	
			ART UNIT 2128	PAPER NUMBER
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE		DELIVERY MODE
3 MONTHS		03/23/2007		PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/728,295	Applicant(s) SOLIMAN ET AL.	
	Examiner Kibrom K. Gebresilassie	Art Unit 2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 December 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 March 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This communication is responsive to amended application filed on December 27, 2006.
2. Claims 1-29 are pending.
3. Claims 3, and 18-24 are amended.

Response to Arguments

4. Response to drawing Objection: Applicants are submitted two replacement sheets of drawings to overcome the objection made in pervious Office action. Accordingly, the objection is withdrawn.
5. Response to Specification Objection: Applicants are amended the specification to correct some minor informalities. Accordingly, the objection is withdrawn.
6. Response to 101 rejection:
 - a. Regarding Claim 24: Applicants are added a limitation of "inducting at least one fracture in the subterranean formation". The recited limitation used to achieve the application recited in the preamble of the claim. Therefore, the claimed invention is statutory and the rejection for claim 24 and its dependent claims are withdrawn.
 - b. Regarding Claims 1 and 18: Applicants are argued that Claim 1, and 18 are not drawn to non-statutory subject matter. Examiner respectfully disagrees. The claimed invention of Claim 1, and 18 are non-statutory. Because the claimed invention appears to merely be a series of acts or steps. The tangible result is not

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achieved until the transformation applied in a meaningful way that it has a real world value.

MPEP 2106 states as follows:

"The tangible requirement does not necessarily mean that a claim must either be tied to a particular machine or apparatus or must operate to change articles or materials to a different state or thing. However, the tangible requirement does require that the claim must recite more than a 35 U.S.C. 101 judicial exception, in that the process claim must set forth a practical application of that judicial exception to produce a real-world result. Benson, 409 U.S. at 71-72, 175 USPQ at 676-77 (invention ineligible because had "no substantial practical application."). "[A]n application of a law of nature or mathematical formula to a ... process may well be deserving of patent protection." Diehr, 450 U.S. at 187, 209 USPQ at 8 (emphasis added); see also Corning, 56 U.S. (15 How.) at 268, 14 L.Ed. 683 ("It is for the discovery or invention of some practical method or means of producing a beneficial result or effect, that a patent is granted . . ."). In other words, the opposite meaning of "tangible" is "abstract."

c. Therefore, the 101 rejection of Claim 1, and 18 are maintained.

7. Response to 102 rejection: Applicant's arguments filed December 27, 2006 have been fully considered but they are not persuasive.

d. Regarding Claim 1:

i. Applicant's argued that the prior art of reference does not teach or disclose "determining a **geomechanical maximum number of fractures** based on the geomechanical stress induced by each of the fractures."

However, examiner respectfully disagrees. The prior art of reference (soliman et al) discloses the determination of maximum number of fractures with time. The prior art of reference states that *the number of fractures reaches five after a month and declined to only two fractures after twenty four months, which is clearly shows that the maximum number of fractures (i.e. five) within a month (See: page 969, middle column, lines 9-13).*

- ii. Applicant's arguments fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references.
- e. Regarding Claims 18, and 24: The same argument will apply for Claim 18, and 24, because they have similar limitation as Claim 1.
- f. Regarding Claims 2-17, 19-23, and 25-29: No argument was presented except their dependency to Claim 1, 18, and 24. Applicants argument presented have been fully considered but they are not persuasive as stated above for Claim 1.
- g. Therefore, the rejection of 102 is maintained.

Claim Objections

- 8. Claims 18 and 20 are is objected to because of the following informalities:
 - h. Claim 18, "...program in a **tangilbe** medium" should be read as "...program stored in a **tangible** medium."
 - i. Claim 20, "The **method** according..." should be read as "The **computer program** according...."

Appropriate correction is required.

Claim Rejections - 35 USC § 102

- 9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 1-29 are rejected under 35 U.S.C. 102(b) as being anticipated by M.Y. Soliman, J. L. Hunt, and A. M. Elrabaa, "Fracturing Aspects of Horizontal wells", herein referred as Soliman, 1990 Society of Petroleum Engineers, pages 966-973.

As per Claim 1:

Soliman discloses a method of optimizing a number, placement and size of fractures in a subterranean formation (**See: "Summary" in page 966**) comprising the steps of:

(a) determining one or more geomechanical stresses induced by each fracture based on the dimensions and location of each fracture (such as...**three methods to determine stress magnitude and/or orientation...**; **See: page 967, Section "Determining Magnitude and Orientation of Least Principal Stress" lines 5-14**);

(b) determining a geomechanical maximum number of fractures based on the geomechanical stresses induced by each of the fractures (such as...**reaching five fractures after a month(i.e. five fractures are maximum number of fractures) but declined to only two fractures after 24 month...**; **See: page 969, middle column, lines 9-13**); and

(c) determining a predicted stress field based on the geomechanical stresses induced by each fracture (such as ...**summary of Stress Data...**; **See: Table 2**).

As per Claim 2:

Soliman discloses the method according to claim 1, wherein steps (a), (b), and (c) are performed prior to creating any of the fractures in the subterranean formation

(such as **...a simulated fracture is initiated...**; See: page 971, left side, lines 5-10).

As per Claim 3:

Soliman discloses the method according to claim 1, further comprising the steps of: determining a cost-effective number of fractures; determining an optimum number of fractures, where the optimum number of fractures is the maximum cost-effective number of fractures that does not exceed the geomechanical maximum number of fractures (such as **determine the optimum location of the well to yield maximum exposure of the pay zone...**; See: page 970, right side, lines 15-17).

As per Claim 4:

Soliman discloses the method according to claim 1, further comprising the step of spacing the fractures a uniform distance from each other (See: Fig. 2).

As per Claim 5:

Soliman discloses the method according to claim 1, further comprising the step of creating the fractures with a uniform size (such as **...fractures are identical in physical dimensions....**; See: page 969, left side column, lines 3-5).

As per Claim 6:

Soliman discloses the method according to claim 1, further comprising the steps of: creating one or more fractures in the subterranean formation; and repeating steps (a), (b), and (c) after each fracture is created (such as **...multiple fractures may be created...**; See: "Conclusion" lines 1-3).

As per Claim 7:

Soliman discloses the method according to claim 6, wherein the repeating step comprises the steps of gathering and analyzing real-time fracturing data for each fracture created (such as *...an actual well was logged between....*;See: page 971, right side, lines 1-4; Table 2).

As per Claim 8:

Soliman discloses the method according to claim 7, wherein a well is placed in the subterranean formation, the well comprising a wellhead, a tubing, and a well bore (See: fig. 2), the well bore comprising a downhole section, and wherein the gathering of real-time fracturing data comprises the steps of: (i) measuring a fracturing pressure while creating a current fracture (such as *...the limits of the treatment pressure to achieve certain fracture growth can be determined...*;See: page 970, right side, lines 4-14); (ii) measuring a fracturing rate while creating the current fracture; and (iii) measuring a fracturing time while creating the current fracture (such as *...the number of fractures at which the maximum flow rate occurs declines with time...*;See: page 969, middle column, lines 9-13).

As per Claim 9:

Soliman fails expressly to disclose one or more transducers located at the wellhead. However, the limitation, one or more transducers, is deemed to be inherent to the teaching of Soliman as page 970 right side column, lines 4-14, which shows determination of pressure. The determination of pressure will be impossible if there is no any sensing device at the wellhead in the system of Soliman.

As per Claim 10:

Soliman fails expressly to disclose one or more transducers located at the down hole. However, the limitation, one or more transducers, is deemed to be inherent to the teaching of Soliman as page 970 right side column, lines 4-14, which shows determination of pressure. The determination of pressure will be impossible if there is no any sensing device at the down hole in the system of Soliman.

As per Claim 11:

Soliman discloses the method according to claim 8, wherein the fracturing pressure is measured in the tubing (such as ***...equation A-5 and A-6 ensure the continuous change of pressure and rate inside the fracture...***; See: Appendix A equation A-5 and A-6).

As per Claim 12:

Soliman discloses the method according to claim 7, wherein analyzing of real-time fracturing data comprises the steps of: determining a new stress field, based on the real-time fracturing data; and comparing the new stress field with the predicted stress field (such as ***an actual well with stress every 10 ff and ...simulated fracture... and comparison is done in Fig. 17***; See: page 971, left side, lines 1-15).

As per Claim 13:

Soliman discloses the method according to claim 12, further comprising the step of decreasing the number of fractures in response to the real-time fracturing data (such as ***...the number of fractures at which the maximum flow rate occurs declines with time...***; See: page 969, middle column, lines 9-13).

As per Claim 14:

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Soliman discloses the method according to claim 12, further comprising the step of increasing the distance between the fractures in response to the real-time fracturing data (such as... ***penetrate 40 ft, instead of 5ft,....***;See: page 971, left side, lines 25-37).

As per Claim 15:

Soliman discloses the method according to claim 12, further comprising the step of adjusting the size of the fractures in response to the real-time fracturing data (such as ***...the limits of the treatment pressure to achieve certain fracture growth can be determined....***;See: page 970, right side, lines 4-14).

As per Claim 16:

Soliman discloses the method according to claim 1, wherein the subterranean formation comprises a well bore comprising a generally vertical portion (such as ***...vertical fracture....***;See: page 967, right side column, lines 36-40; Fig. 3 ***Vertical and horizontal wellbore***).

As per Claim 17:

Soliman discloses the method according to claim 16, wherein the well bore further comprises one or more laterals (Fig. 2).

As per Claims 18 and 24:

The limitations of claims 18 and 24 have already been discussed in the rejection of Claim 1. They are therefore rejected under the same rationale.

As per Claims 19 and 25:

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The limitations of claims 19 and 25 have been discussed in the rejection of Claim 2. They are therefore rejected under the same rationale.

As per Claims 20 and 26:

The limitations of claims 20 and 26 have already been discussed in the rejection of Claim 3. They are therefore rejected under the same rationale.

As per Claims 21 and 27:

The limitations of claims 21 and 27 have already been discussed in the rejection of Claim 6. It is therefore rejected under the same rationale.

As per Claim 22 and 28:

The limitations of claims 22 and 28 have already been discussed in the rejection of Claim 7. They are therefore rejected under the same rationale.

As per Claim 23 and 29:

The limitations of claims 23 and 29 have already been discussed in the rejection of Claim 12. They are therefore rejected under the same rationale.

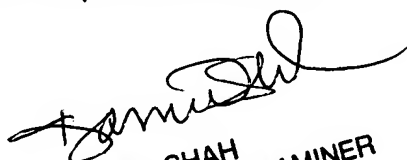
Conclusion

11. Claims 1-29 are rejected.
12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

13. Any inquiring concerning this communication or earlier communication from the examiner should be directed to Kibrom K. Gebresilassie whose telephone number is (571) 272-8571. The examiner can normally be reached on Monday-Friday, 8:30 am to 4:30 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner supervisor, Kamini Shah can be reached at (571) 272-2279. The official fax number is (571) 273-8300. Any inquiring of a general nature relating to the status of this application should be directed to the group receptionist whose telephone number is (571) 272-3700.

Kibrom K. Gebresilassie
AU 2128


KAMINI SHAH
SUPERVISORY PATENT EXAMINER